

WHAT IS CLAIMED IS:

1. A device for processing multi-up panels comprising:
a bad mark scanner for reading a surface of a multi-up panel; and
a processor receiving at least one input from the scanner for determining a bad mark on the multi-up panel.
2. The device as recited in claim 1 wherein the bad mark scanner is located on an assembly line upstream from a placement machine, the placement machine receiving an input from the processor.
3. The device as recited in claim 2 further comprising a conveyor for transporting the multi-up panel between the bad mark scanner and the placement machine.
4. The device as recited in claim 1 wherein the scanner is a line scanner.
5. The device as recited in claim 1 further comprising a bar code reader for reading bar code information of the multi-up panel.
6. The device as recited in claim 1 further comprising a database for storing information related to circuits on the multi-up panel, the database accessible by the processor.
7. The device as recited in claim 1 wherein the bad mark scanner is located on an assembly line upstream from at least one multi-up panel processing machine for placing at least one component on the multi-up panel, the at least one multi-up panel processing machine receiving at least one input from the processor.

8. The device as recited in claim 7 wherein the at least one processing machine includes a plurality of placement machines located downstream from the scanner.

9. The device as recited in claim 7 further comprising a bar code reader assigned to the at least one processing machine.

10. The device as recited in claim 7 further comprising a LAN connecting the at least one processing device and the processor.

11. The device as recited in claim 1 wherein the scanner has a resolution of 300x300 dots per square inch or fewer.

12. A circuit panel manufacturing assembly line comprising:

a circuit panel bad mark scanner;

a panel component placement machine separate from the scanner; and

a panel conveyor located at least between the circuit panel scanner and the panel component placement machine for conveying the panels.

13. The circuit panel manufacturing assembly line as recited in claim 12 wherein the scanner is a line scanner.

14. The circuit panel manufacturing assembly line as recited in claim 12 further comprising a second component placement machine located next to the conveyor.

15. The circuit panel manufacturing assembly line as recited in claim 12 further comprising a bar code reader located next to the conveyor.

16. The circuit panel manufacturing assembly line as recited in claim 12 further comprising a bar code reader located between the scanner and the placement machine.

17. The circuit panel manufacturing assembly line as recited in claim 12 further comprising a processor connected to the scanner and the placement machine.

12) 18. The circuit panel manufacturing assembly line as recited in claim 12 wherein the scanner is a stationary line scanner.

19. The circuit panel manufacturing assembly line as recited in claim 12 further comprising a communications network connecting the scanner and the placement machine.

20. The circuit panel manufacturing assembly line as recited in claim 19 wherein the communications network is a LAN.

21. The circuit panel manufacturing assembly line as recited in claim 19 wherein the communications network is a wireless network.

22. The circuit panel manufacturing assembly line as recited in claim 19 wherein the communications network is a WAN.

23. The circuit panel manufacturing assembly line as recited in claim 19 wherein the communications network is a global information network.

24. A method for determining bad marks on multi-up panels comprising the steps of:
scanning a multi-up panel with a scanner so as to form scan data; and
determining a bad mark on the multi-up panel as a function of the scan data.

25. The method as recited in claim 24 further comprising scanning a bar code on the multi-up panel.

26. The method as recited in claim 24 further comprising transmitting bad mark data to at least one placement machine.

27. The method as recited in claim 26 wherein the bad mark data is transmitted over a LAN.

28. The method as recited in claim 26 wherein the bad mark data is transmitted over a global communication network.

29. The method as recited in claim 24 wherein the scanning step includes line scanning the multi-up panel.

30. The method as recited in claim 24 further comprising conveying the panel on a conveyor belt.

31. The method as recited in claim 24 wherein the scanning step occurs at a resolution of or below 300x300dots per square inch.

32. A multi-up panel comprising a plurality of circuits, each circuit having a bad mark area for application of a bad mark, the multi-up panel being processed with the method of claim 24.